

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

DESCRIPTION OF A COLLECTION OF UNSTALKED
CRINOIDS MADE BY CAPTAIN SUENSON IN
EASTERN ASIA.

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From a zoögeographical point of view one of the most interesting of the present coast lines is that of Eastern Asia, from Cochin China northward. Although it was from this region that, two hundred and two years ago, the first erinoid outside of the two commonest European species was described (Petiver's *Stella Chinensis perlegens*) it is only within the last decade that our knowledge of the species inhabiting this area has emerged from the preliminary stage of widely scattered records, mostly accompanying descriptions of new species.

While a number of naturalists have gathered material in restricted localities, particularly in southern Japan, general collections covering the entire region, or any large part of it, have been extremely few—limited, in fact, to two, that of the U. S. Fisheries Steamer *Albatross*, and that of Captain Suenson.

Much of Captain Suenson's material has already been recorded (Vidensk. Medd. fra den naturhist. Forening i Köbenhavn, 1909, pp. 116-194); but since the publication of these records additional specimens have been received from him which, on account of their unusual interest, are well worthy of special mention.

Broadly speaking the erinoids of eastern Asia include species derived from four distinct faunal regions (1) the East Indian, (2) the southern Japanese, (3) the Arctic and (4) the Antarctic.

1. East Indian species, occurring in the Philippine Islands and on the coast of Cochin China, reach northward as far as Hong Kong, one of them possibly as far as Fuchow.

2. Southern Japanese species range from Tokyo Bay westward to the Korean Straits and thence southward along the Riu Kiu Islands to Formosa and Hong Kong, where they occur together with East Indian forms.

3. Arctic species inhabit the cold water which bathes the continental shores of the Sea of Japan, extending southward as far at least as the Korean Straits, possibly even to Shanghai.

4. Antarctic species inhabit the Pacific coast of Japan, and reach their southern limit at Tokyo and Sagami Bays.

From the coast of Asia between Cochin China and Korea we know 36 species of unstalked crinoids of which 17 may be regarded as East Indian, 15 as southern Japanese, and 2 as Arctic; one is of very general distribution throughout the eastern tropics, and one is doubtfully East Indian, being related to other species occurring in the Moluccas and at Tahiti. These species, with their ascertained range in this region, are:

FAMILY COMASTERIDÆ.*

- Comatella stelligera* (P. H. Carpenter) (E. I.).—?Chinese coast.
Capillaster macrobrachius (Hartlaub) (E. I.).—China Sea.
Capillaster multiradiata (Linné) (E. I.).—China Sea; Formosa (Taiwan).
Comatula solaris Lamarck (E. I.).—China Sea; Hong Kong.
Comaster gracilis (Hartlaub) (E. I.).—Pulo Edam, China Sea.
Comaster fruticosus A. H. Clark (E. I.).—East coast of China.
Comantheria imbricata (A. H. Clark) (J.).—Eastern Asia (probably Korean Straits).
Comantheria grandicalyx (P. H. Carpenter) (J.).—Canton; Fuchow.
Comanthus solaster (A. H. Clark) (J.).—Formosa Strait.
Comanthus japonica (J. Müller) (J.).—Hong Kong (see beyond).
Comanthus parvicirra (J. Müller) (G.).—China Sea; Pescadores Islands (near Formosa); Amoy.

FAMILY ZYGOMETRIDÆ.

- Zygometra comata* A. H. Clark (E. I.).—Hong Kong.
Catoptometra rubroflava (A. H. Clark) (J.).—Hong Kong (see beyond).

* The significance of the letters in parentheses after the specific names is as follows: E. I., a member of the East Indian fauna; J., a member of the southern Japanese fauna; Arc., a member of the Arctic fauna; G., generally distributed.

FAMILY HIMEROMETRIDÆ.

- Amphimetra variipinna* (P. H. Carpenter) (E. I.).—Canton.
Amphimetra sinensis (Hartlaub) (?E. I.).—Hong Kong.
Amphimetra laeripinna (P. H. Carpenter) (J.).—Canton.
Himerometra magnipinna A. H. Clark (E. I.).—Cochin China.
Craspedometra acuticirra (P. H. Carpenter) (E. I.).—Hong Kong.

FAMILY MARIAMETRIDÆ.

- Mariametra subcarinata* (A. H. Clark) (J.).—Formosa Strait.
Dichrometra döderleini (de Loriol) (J.).—Eastern Asia (probably Korean Straits).
Dichrometra flagellata (J. Müller) (E. I.).—Hong Kong (see beyond).
Lamprometra protectus (Lütken) (E. I.).—Pulo Condor, Cochin China; Hong Kong.

FAMILY COLOBOMETRIDÆ.

- Cenometra abbotti* (A. H. Clark) (E. I.).—Pulo Taya, China Sea.
Cenometra bella (Hartlaub) (E. I.).—North Watcher Island, Gulf of Tonkin.
Cyllometra albopurpurea A. H. Clark (J.).—Okinawashima, Riu Kiu Islands.
Decametra tigrina (A. H. Clark) (J.).—Eastern Asia (probably Korean Straits).
Oligometra serripinna (P. H. Carpenter) (E. I.).—Fuchow.

FAMILY TROPIOMETRIDÆ.

- Tropiometra eucrinus* A. H. Clark (E. I.).—Eastern Asia.

FAMILY THALASSOMETRIDÆ.

- Asterometra lepida* A. H. Clark (J.).—Formosa Strait.
Stenometra dorsata A. H. Clark (J.).—Eastern Asia (probably Korean Straits).

FAMILY CHARITOMETRIDÆ.

- Strolometra hepburniana* (A. H. Clark) (J.).—Eastern Asia (probably Korean Straits).

FAMILY ANTEDONIDÆ.

- Euantedon sinensis* A. H. Clark (?E. I.).—?Chinese coast.
Compsometra serrata (A. H. Clark) (J.).—Formosa Strait.
Erythrometra ruber (A. H. Clark) (J.).—Eastern Asia (probably Korean Straits).
Heliometra maxima (A. H. Clark) (Arc.).—Eastern Asia (probably Korea).
Heliometra biarticulata A. H. Clark (Arc.).—?Shanghai.

The species represented in the collection recently received from Captain Suenson are the following:

FAMILY COMASTERIDÆ.

SUB-FAMILY COMASTERINÆ.

***Comanthus japonica* (J. Müller).**

Locality.—Eight miles outside of Hong Kong harbor (22° 12' N. lat., 114° 15' E. long.); 14 fathoms; November 16, 1911.

Remarks.—The cirri of the single specimen collected are xxviii, 31-34, 35 mm. to 40 mm. long; the segments in the outer half are broader than long, highly polished, and bear high sharp carinate processes. There are about forty arms 150 mm. long; all of the division series are 4 (3+4).

The right anterior ray of this individual is very abnormal; on the right II Br series (as viewed dorsally) the inner III Br series terminates in a doubled axillary—two axillaries side by side—forming an epizygial superposed upon the single hypozygal of the syzygial pair; each half of this doubled axillary gives off two arms so that four arms arise from this division series. Ventrally the ambulacral groove on reaching this axillary divides into three parts, one of which runs to the left (right as viewed dorsally) and soon divides, supplying two arms, while the other two run undivided to the two remaining arms. The left II Br series arising from this ray is undivided; it consists of only nine brachials of which the last bears a single terminal pinnule of large size; the structure tapers regularly from the axillary to the base of the terminal pinnule; the third and fourth brachials are united by syzygy so that this arm stump bears seven pinnules in all, six lateral on alternate sides of the arm and one terminal.

This specimen appears undoubtedly to be referable to *Comanthus japonica*, though the edges of the brachials and of the elements of the division series are less prominent than usual, and the cirri are rather longer and more slender than is ordinarily the case. It agrees well, however, with specimens at hand from various localities in southern Japan.

The small number of arms and the processes on the distal cirrus segments distinguish it from the variety of *Comanthus bennetti* occurring at St. Mathias Island (Proc. U. S. Nat. Mus., vol. 43, 1912, p. 391) which is characterized by short outer cirrals. The much larger number of cirri, cirrus segments and arms readily distinguish it from the southern *Comanthus crassicirra* which represents *C. japonica* in the Moluccas.

FAMILY ZYGOMETRIDÆ.

***Zygometra comata* A. H. Clark.**

Locality.—Eight miles outside of Hong Kong harbor (22° 12' N. lat., 114° 15' E. long.); 14 fathoms; November 16, 1911.

Remarks.—The better of the two specimens has the centro-dorsal discoidal, very slightly concave (almost flat) on the broad dorsal pole which is 5 mm. in diameter; the cirri are arranged in two irregular closely

crowded marginal rows, and are xxix, 34-36, 20 mm. to 27 mm. long; the longest proximal cirrus segments are usually from one-third to one-half again as broad as long, and the outer cirrus segments are two and one-half or three times as broad as long; the eighth or ninth and following bear prominent, rather slender, dorsal spines which in the outer part of the cirri become more or less broadened laterally, forming short high transverse ridges or ending in a more or less completely bifurcated tip; toward the extremity of the cirrus the dorsal spines again resume their normal character. There are about thirty-eight arms about 90 mm. long; there are five ii Br series of 4 (3+4) and four of 2; there are eleven iii Br series of 4 (3+4), and four of 2; the single iv Br series is 4 (3+4); the radials, division series and arms are similar to those of specimens from Singapore.

The other specimen is similar; there are about forty arms; the ten ii Br series are 4 (3+4); three of the iii Br series are 2, the remainder being 4 (3+4); two iv Br series are present, one of 2 and one of 4 (3+4). The cirri are xxviii, 33-35, about 25 mm. long.

Both specimens are dull pinkish with purple cirri, the earlier segments of the latter with white borders and a white dorsal surface.

Except for the greater number of arms these specimens agree perfectly with a series at hand from Singapore and from the Philippine Islands.

This species differs from the Australian *Zygometra elegans* in possessing fewer arms, greater regularity in the division series, smaller and shorter cirri which have fewer segments, and broader and less strongly rounded division series.

***Catoptometra rubroflava* (A. H. Clark).**

Locality.—Eight miles outside of Hong Kong harbor (22° 12' N. lat., 114° 15' E. long.); 14 fathoms; November 16, 1911.

Remarks.—Five specimens were secured; the best of these has thirteen arms 100 mm. long; the three ii Br series are 4 (3+4); the cirri are xxvii, 16-17, about 15 mm. long; the longest proximal cirrus segments are nearly or quite as long as the median dorsoventral diameter. A second specimen has twelve arms about 110 mm. long; the two ii Br series are 4 (3+4); the cirri are xxviii, 15, about 13 mm. long. A third has also twelve arms, the two ii Br series being 4 (3+4); there are 14-16 cirrus segments. A small specimen has ten arms 60 mm. long. The fifth is much broken.

The color in life appears to have been bright yellow broadly banded with bright red, as in the type of the species.

These specimens agree well with the type and with other examples of *C. rubroflava* from southern Japan.

FAMILY MARIAMETRIDÆ.

***Dichrometra flagellata* (J. Müller).**

Locality.—Eight miles outside of Hong Kong harbor (22° 12' N. lat., 114° 15' E. long.); 14 fathoms; November 16, 1911.

Remarks.—The single specimen, which agrees well with examples at hand from Singapore, has thirty-five arms 115 mm. long; the extra axillaries are all developed exteriorly; the cirri are XXII, 26-29, 15 mm. to 20 mm. long.

FAMILY COLOBOMETRIDÆ.

Oligometra serripinna (P. H. Carpenter).

Locality.—San Bernardino Strait, between Luzon and Samar, Philippine Islands ($12^{\circ} 27' N.$ lat., $124^{\circ} 03' E.$ long.); 50-100 fathoms; bottom temperature 61° Fahrenheit.

Remarks.—One small specimen with arms 37 mm. long was secured at this locality.

FAMILY THALASSOMETRIDÆ.

Parametra orion (A. H. Clark).

Locality.—South of the Goto Islands ($32^{\circ} 25' N.$ lat., $128^{\circ} 52' E.$ long.); 124 fathoms; bottom temperature 55° Fahrenheit.

Remarks.—The single example from this locality has fifteen arms 125 mm. long, and cirri XVIII 23-24, 21 mm. to 23 mm. long.

FAMILY ANTEDONIDÆ.

SUBFAMILY BATHYMETRINÆ.

Thaumatometra tenuis (A. H. Clark).

Locality.—Off northeastern Korea ($41^{\circ} 58' N.$ lat., $130^{\circ} 30' E.$ long.); 620 fathoms.

Remarks.—One small specimen was secured at this locality.